

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

TETSUYA HARA

Application No. Unassigned Art Unit: Unassigned

Filed: August 20, 2001 Examiner: Unassigned

For: METHOD OF AND
APPARATUS FOR
DECODING AUDIO
DATA

PRELIMINARY AMENDMENT

Commissioner for Patents
Washington, D. C. 20231

Dear Sir:

Prior to the examination of the above-identified patent application, please enter the following amendments and consider the following remarks.

IN THE SPECIFICATION:

Replace the paragraph beginning at page 1, line 8, with:

Fig. 7 is a block diagram showing a schematic structure of a conventional audio decoding apparatus. This audio decoding apparatus has the decoding section 1, data buffer 2, and output section 3. The decoding section 1 receives and decodes a coded digital audio data stream, such as Dolby AC-3, read from a recording medium of digital audio data, such as a DVD (Digital Video Disc), and outputs PCM audio data. The PCM audio data output from the decoding section 1 are temporarily stored in the data buffer 2 so as to cope with synchronization with image information and a fluctuation in an input bit rate of the digital audio data stream or the like. The output section 3 receives the PCM audio data from the data buffer 2 and outputs audio serial data to an D/A (digital/analog) converter or the like or output digital audio data into a digital audio interface receiver. If

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the digital audio data stream has multi-channels, the output section 3 outputs time series data (PCM audio data) output from the decoding section 1 into a plurality of digital/analog converters corresponding to respective channels or to a plurality of digital audio interface receivers.

Replace the paragraph beginning at page 3, line 12, with:

However, in case of the audio decoding apparatus disclosed in Japanese Patent Application Laid-Open No. 2000-278136, memory requirement or bus transmission requirement increases because of the additional tag data added to each of the PCM audio data. For example, if the PCM audio data are 24 bits and the tag data are 8 bits, then total PCM audio data becomes 27 Kbytes and total tag data becomes 9 Kbytes for one audio frame (1 K byte = 1024 bytes). Thus, in this example, the total memory requirement and bus transmission requirement becomes 36 K bytes.

Replace the paragraph beginning at page 5, line 8, with:

Fig. 9 is a schematic diagram showing the structure of PCM audio data output from a conventional audio decoding apparatus.

IN THE CLAIMS

Replace the indicated claims with::

1. (Amended) An audio decoding method comprising:
receiving audio data including a plurality of coded sample data;
decoding the coded sample data;
grouping a plurality of the sample data, after decoding, into a block;
adding control information relating to an attribute to each block;
temporarily storing the blocks; and
outputting the sample data of each block, temporarily stored, based on the control information added to the respective block.

2. (Amended) An audio decoding apparatus comprising:

a decoding unit which receives audio data including a plurality of coded sample data, decodes the sample data, groups a plurality of the sample data, after decoding, into a block, and adds control information relating to an attribute to each block;

a storage unit which temporarily stores the blocks; and

an output unit which outputs the sample data of each block, temporarily stored, based on the control information added to the respective block.

3. (Amended) The audio decoding apparatus according to claim 2, wherein said decoding unit groups the sample data into the block in frame units.

4. (Amended) The audio decoding apparatus according to claim 2, wherein said decoding unit groups sample data having identical attributes into one block.

5. (Amended) The audio decoding apparatus according to claim 2, wherein said decoding unit adds to the control information starting information that indicates sample data from which output control can be started.

6. (Amended) The audio decoding apparatus according to claim 2, wherein said decoding unit adds to the control information channel information indicating number of channels that are to be output for each sample data.

7. (Amended) The audio decoding apparatus according to claim 2, wherein said decoding unit adds to the control information number information indicating number of sample data that have been grouped in one block.

8. (Amended) The audio decoding apparatus according to claim 2, wherein said decoding unit adds to the control information information indicating a down sample.

9. (Amended) The audio decoding apparatus according to claim 2, wherein said decoding unit adds to the control information length information indicating word length of data to be output.

10. (Amended) The audio decoding apparatus according to claim 2, wherein said decoding unit adds to the control information length information indicating word length of data to be output when there are plurality of outputs.

11. (Amended) The audio decoding apparatus according to claim 2, wherein said decoding unit adds to the control information channel information indicating formation of an output channel.

12. (Amended) The audio decoding apparatus according to claim 11, wherein said decoding unit adds to the control information slot information indicating number of slots of the output channel.

14. (Amended) The audio decoding apparatus according to claim 2, wherein said decoding unit adds to the control information distribution information indicating data distribution of said output unit.

IN THE ABSTRACT

Replace the Abstract with:

ABSTRACT OF THE DISCLOSURE

An audio decoding apparatus includes a CPU which groups received sample data into one block. Furthermore, the CPU adds control information relating to attributes to data of each block.

REMARKS

The foregoing amendments are made to correct minor translational errors and to meet United States requirements as to form. No new matter is added.

Respectfully submitted,

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**AMENDMENTS TO SPECIFICATION, CLAIMS AND
ABSTRACT MADE VIA PRELIMINARY AMENDMENT**

Amendments to the paragraph beginning at page 1, line 8:

Fig. 7 is a block diagram showing a schematic structure of a conventional audio decoding apparatus. This audio decoding apparatus has the decoding section 1, data buffer 2, and output section 3. The decoding section 1 receives and decodes a coded digital audio data stream, such as Dolby AC-3, read from a recording medium of digital audio data, such as a DVD (Digital Video Disc), and outputs PCM audio data. The PCM audio data output from the decoding section 1 are temporarily stored in the data buffer 2 so as to cope with synchronization with image information and a fluctuation in an input bit rate of the digital audio data stream or the like. The output section 3 receives the PCM audio data from the data buffer 2 and outputs audio serial data to an D/A (digital/analog) converter or the like or output digital audio data into a digital audio interface receiver. If the digital audio data stream has multi-channels, the output section 3 outputs time series data (PCM audio data) output from the decoding section 1 into a plurality of digital/analog converters corresponding to respective channels or to a plurality of digital audio interface receivers.

Amendments to the paragraph beginning at page 3, line 12:

However, in case of the audio decoding apparatus disclosed in Japanese Patent Application Laid-Open No. 2000-278136, memory requirement or bus transmission requirement increases because of the additional ~~the tag data are~~ added to each of the PCM audio data. For example, if the PCM audio data are 24 bits and the tag data are 8 bits, then total PCM audio data becomes 27 Kbytes and total tag data becomes 9 Kbytes for one audio frame (1 K byte = 1024 bytes). Thus, in this example, the total memory requirement and bus transmission requirement becomes 36 K bytes.

Amendments to the paragraph beginning at page 5, line 8:

Fig. 9 is a schematic diagram showing ~~a the~~ the structure of PCM audio data ~~to be~~ output from a conventional audio decoding apparatus.

Amendments to the existing claims:

1. (Amended) An audio decoding method comprising ~~the steps of:~~
receiving audio data including a plurality of coded sample data;
decoding the coded sample data;
groupgrouping a plurality of the sample data, after decoding, into a block;
adding control information relating to an attribute to each block;
temporarily storing the sample data grouped into the blocks; and
outputting the ~~temporarily stored~~ sample data of each block, temporarily stored,
based on the control information added to the respective block.
2. (Amended) An audio decoding apparatus comprising:
a decoding unit which receives audio data including a plurality of coded sample data, decodes the sample data, groups a plurality of the sample data, after decoding, into a block, and adds control information relating to an attribute to each block;
a storage unit which temporarily stores the ~~decoded sample data~~ blocks; and

an output unit which outputs the ~~temporarily stored~~ sample data of each block, temporarily stored, based on the control information added to the respective block.

3. (Amended) The audio decoding apparatus according to claim 2, wherein said decoding unit groups the sample data into the block ~~by in frame-unit units~~.

4. (Amended) The audio decoding apparatus according to claim 2, wherein said decoding unit groups ~~the~~ sample data having ~~same attribute~~ identical attributes into one block.

5. (Amended) The audio decoding apparatus according to claim 2, wherein said decoding unit adds to the control information ~~an~~ starting information that indicates sample data from which ~~the~~ output control can be started.

6. (Amended) The audio decoding apparatus according to claim 2, wherein said decoding unit adds to the control information ~~an~~ channel information indicating number of channels that are to be output for ~~one each~~ sample data.

7. (Amended) The audio decoding apparatus according to claim 2, wherein said decoding unit adds to the control information ~~an~~ number information indicating ~~a~~ number of sample data that have been grouped in one block.

8. (Amended) The audio decoding apparatus according to claim 2, wherein said decoding unit adds to the control information ~~an~~ information indicating a down sample.

9. (Amended) The audio decoding apparatus according to claim 2, wherein said decoding unit adds to the control information ~~an~~ length information indicating word length of data to be output.

10. (Amended) The audio decoding apparatus according to claim 2, wherein said decoding unit adds to the control information ~~an~~ length information indicating word length of data to be output when there are plurality of outputs.

11. (Amended) The audio decoding apparatus according to claim 2, wherein said decoding unit adds to the control information ~~an~~ channel information indicating formation of an output channel.

12. (Amended) The audio decoding apparatus according to claim 11, wherein said decoding unit adds to the control information ~~an~~ slot information indicating number of slots ~~of the formation~~ of the output channel.

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13. The audio decoding apparatus according to claim 12, wherein the number of slots is variable.

14. (Amended) The audio decoding apparatus according to claim 2, wherein said decoding unit adds to the control information ~~an~~ distribution information indicating data distribution of said output unit.

Amendments to the Abstract

ABSTRACT OF THE DISCLOSURE

~~The~~An audio decoding apparatus ~~comprises~~ includes a CPU which groups received ~~plurality of~~ sample data into one block. Furthermore, the CPU adds control information relating to attributes to data of each block.

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PENDING CLAIMS AFTER ENTRY OF PRELIMINARY AMENDMENT

1. An audio decoding method comprising:
receiving audio data including a plurality of coded sample data;
decoding the coded sample data;
grouping a plurality of the sample data, after decoding, into a block;
adding control information relating to an attribute to each block;
temporarily storing the blocks; and
outputting the sample data of each block, temporarily stored, based on the control information added to the respective block.
2. An audio decoding apparatus comprising:
a decoding unit which receives audio data including a plurality of coded sample data, decodes the sample data, groups a plurality of the sample data, after decoding, into a block, and adds control information relating to an attribute to each block;
a storage unit which temporarily stores the blocks; and
an output unit which outputs the sample data of each block, temporarily stored, based on the control information added to the respective block.
3. The audio decoding apparatus according to claim 2, wherein said decoding unit groups the sample data into the block in frame units.

4. The audio decoding apparatus according to claim 2, wherein said decoding unit groups sample data having identical attributes into one block.

5. The audio decoding apparatus according to claim 2, wherein said decoding unit adds to the control information starting information that indicates sample data from which output control can be started.

6. The audio decoding apparatus according to claim 2, wherein said decoding unit adds to the control information channel information indicating number of channels that are to be output for each sample data.

7. The audio decoding apparatus according to claim 2, wherein said decoding unit adds to the control information number information indicating number of sample data that have been grouped in one block.

8. The audio decoding apparatus according to claim 2, wherein said decoding unit adds to the control information information indicating a down sample.

9. The audio decoding apparatus according to claim 2, wherein said decoding unit adds to the control information length information indicating word length of data to be output.

10. The audio decoding apparatus according to claim 2, wherein said decoding unit adds to the control information length information indicating word length of data to be output when there are plurality of outputs.

11. The audio decoding apparatus according to claim 2, wherein said decoding unit adds to the control information channel information indicating formation of an output channel.

12. The audio decoding apparatus according to claim 11, wherein said decoding unit adds to the control information slot information indicating number of slots of the output channel.

13. The audio decoding apparatus according to claim 12, wherein the number of slots is variable.

14. The audio decoding apparatus according to claim 2, wherein said decoding unit adds to the control information distribution information indicating data distribution of said output unit.